it falls off toward the stigmatic end, where the fecundity may be even lower than it is a little farther down in the pod. This is admirably shown in Diagram 3, in which *GG* stands for a series of Burpee's Stringless grown at the Missouri Botanical Garden, *NH* for a series of Navy beans grown at Sharpsburg, Ohio, and *LL* for a series of Golden Wax beans grown at Lawrence, Kansas. All were grown in 1907. Here the percentage of development of ovules at different positions in the pod is shown for the different classes of pods by the scales to the left of the figures. The reader may ascertain the class of pods represented by any particular curve by noting the number of circles representing percentage development in the various positions. These correspond to the number of ovules per pod. In the diagrams the positions (abscissæ) from left to right represent the positions from the base to the tip of the pod.

J. ARTHUR HARRIS

ANOTHER GENE IN THE FOURTH CHROMOSOME OF DROSOPHILA

UNTIL the appearance of bent wings, only three groups of linked genes had been found in *Drosophila amelophila,* although four pairs of chromosomes had been identified in the diploid group. Since the character bent wings, worked out by Mr. H. J. Muller, was found to be unassociated with any of the three groups, the gene producing this character was said to be located in the fourth chromosome.

Recently a new character, designated as eyeless, appeared. Flies having this character either lacked eye pigment and ommatidia or had one or both eyes reduced in size. All of the pure stock showed some loss of eye structures. Eyeless is recessive to the normal eye. In order to determine the linkage, eyeless males were crossed in turn to females of the stocks at Columbia University. These stocks representing the three groups were (1) miniature wings, (2) black body and vestigial wings, and (3) spread wings. The genes producing these characters are in the first, second and third chromosomes, respectively. The F_1 from all three crosses had normal eyes. They were inbred in each case and gave the following.

The equation should be $w = 9.987 + .021\ p$. The line as it appears here is correctly drawn.

Cross 1. Miniature ♀ by Eyeless ♂

	Normal Long	Normal Miniature	Eyeless Long	Eyeless Miniature
F_2.	1142	1106	245	193

Since the eyeless flies were females as well as males, the character eyeless is shown not to be a sex-linked character; for, if it were, it would be inherited only by the grandsons of the eyeless male. Since the eyeless flies are not nearly as viable as the wild stock, the eyeless classes fall below the expectation.

Cross 2. Black Vestigial ♀ by Eyeless ♂

	Normal Long	Normal Vestigial	Eyeless Long	Eyeless Vestigial
F_2.	1303	417	278	97

The same count, when grouped according to the body color, was as follows:

	Normal Gray	Normal Black	Eyeless Grey	Eyeless Black
F_2.	1289	431	293	82

Cross 3. Spread ♀ by Eyeless ♂

	Normal not Spread	Normal Spread	Eyeless not Spread	Eyeless Spread
F_2.	1349	373	300	76

Allowing for the decreased viability of eyeless, both of the preceding crosses may be regarded as 9 : 3 : 3 : 1 ratios. Hence they show that there is no linkage of eyeless with the characters whose genes are in the second and third chromosomes.

Eyeless females were then crossed to bent-winged males (Cross 4). No bent eyeless flies were produced in the F_2. As the count was small, the F_2 bent flies were crossed to the F_2 eyeless, and then the F_3 normal, which had the same germinal constitution as the F_1, were inbred to give F_4, which should give the same results as the F_2.

Cross 4. Bent ♂ by Eyeless ♀

	Normal not Bent	Normal Bent	Eyeless not Bent	Eyeless Bent
F_2.	596	193	195	0
F_4.	741	172	131	0
Total	1337	365	326	0

Since an approximate 2 : 1 : 1 : 0 ratio, instead of a 9 : 3 : 3 : 1 ratio, was realized, the conclusion that eyeless and bent belong

to the same group and in this sense may be said to be in the same chromosome pair is evident. Until a bent eyeless fly—a cross over—is obtained, the amount of crossing over between these two characters in the fourth chromosome can not be directly determined.

MILDRED A. HOGE

AN ABNORMAL HEN'S EGG

IN a frequently quoted paper, Parker ('06) has classified double eggs on the basis of the factors supposedly concerned in their formation. Considering the ovarian and oviducal factors as independent, Parker says:

> As a result of these two factors, three classes of double eggs can be distinguished; first, those whose yolks have come from an abnormal ovary but have passed through a normal oviduct; secondly, those whose yolks have come from a normal ovary but have passed through an abnormal oviduct; and finally those produced by an ovary and oviduct both of which have been abnormal in their action.

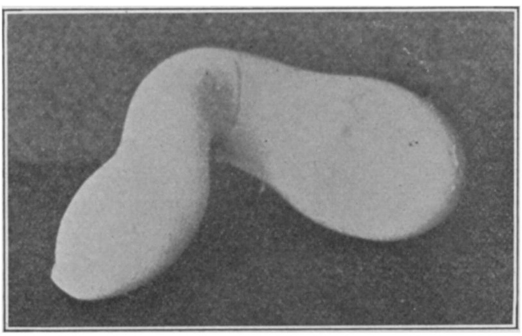

FIG. 1. PHOTOGRAPH OF THE SPECIMEN × 1.

Cases of ovum in ovo have been attributed by Parker and others to antiperistalsis. Patterson ('11) mentions a case of an inclosed double egg in which there were two distinct peristaltic actions. Féré ('98) has called attention to the fact that hens frequently lay several double eggs in succession. Féré claims that he succeeded in producing double eggs in a hen which normally laid single eggs, by drugging her with atropine sulphate. Glaser ('13) has described the ovary of a hen which habitually laid double eggs and concludes that fusion of the follicles is the explanation of some double eggs.